CLAIMS

1. A method of determining weight for a grammar option in a speech recognition grammar, the method comprising:

associating a statistic with each grammar option that approximates a first probability of uttering that grammar option;

dividing the grammar options into groups based on the statistic;

determining for each group a second probability of uttering any grammar option within that group; and

determining an average probability of uttering one grammar option in each group.

2. The method of Claim 1, further comprising estimating the weight of each grammar option in a group based on an interpolation between the second probability of a group including the grammar option and the second probability of a next closest group.

3. The method of Claim 2, further comprising replacing the estimated weight for a first grammar option with an actual probability based on a number of utterances associated with the first grammar option divided by a total number of utterances in an utterance training set of grammar options.

4. The method of Claim 3, wherein the estimated weight is found to be significantly lower than the actual frequency of the grammar option.

5. The method of Claim 1, wherein dividing the grammar options into groups is based on a normalized value of the statistic.

6. A method of determining weight for an option variant of a grammar option in a speech recognition grammar, the method comprising:

associating a statistic with each option variant that approximates a first probability of uttering that option variant;

dividing the option variants into groups based on the statistic;

determining for each group a second probability of uttering any option variant within that group; and

determining an average probability of uttering one option variant in each group.

7. The method of Claim 6, further comprising estimating the weight of each option variant in a group based on an interpolation between the second probability of a group including the option variant and the second probability of a next closest group.

8. The method of Claim 7, further comprising replacing the estimated weight for a first option variant with an actual probability based on a number of utterances associated with the first option variant divided by a total number of utterances in an utterance training set of option variant.

9. The method of Claim 8, wherein the estimated weight is found to be significantly lower than the actual frequency of the option variant.

10. The method of Claim 6, wherein dividing the option variants into groups is based on a normalized value of the statistic.

11. A method of determining weight for a grammar option in a speech recognition grammar, the method comprising:

determining a correct score and a best competitor score for each utterance in an utterance training set;

comparing the correct score to the best competitor score for each utterance; and

increasing the weight of a first grammar option associated with the correct score by a first amount.

12. The method of Claim 11, wherein the method is iterated to converge on a solution for the weight of grammar option in the speech recognition grammar.

13. The method of Claim 11, further comprising decreasing a weight of a second grammar option associated with the best competitor score by a second amount.

14. The method of Claim 13, wherein the first amount and the second amount decrease in successive iterations.

15. The method of Claim 13, wherein the second amount is based on a derivative of a sigmoid function.

16. The method of Claim 11, wherein the first amount is based on a derivative of a sigmoid function.

17. A method of determining an acoustic score of grammar options in a speech recognition grammar used by an automatic speech recognition (ASR) system, comprising:

applying the speech recognition grammar to the ASR system to obtain an n-best list containing a score of each grammar option variant associated with each grammar option; and

subtracting a grammar weight from the score of each grammar option variant to get the acoustic score of the grammar option variant.

18. The method of Claim 17, wherein the speech recognition grammar applied to the ASR system is a forcing grammar comprising a set of grammar option variants for each grammar option whereby each option variant associated with each grammar option is explicitly specified.

19. A software program for determining weight for a grammar option in a speech recognition grammar, the program comprising:

means for associating a statistic with each grammar option that approximates a first probability of uttering that grammar option;

means for dividing the grammar options into groups based on the statistic;

means for determining for each group a second probability of uttering any grammar option within that group; and

means for determining an average probability of uttering one grammar option in each group.

20. A software program for determining weight for a grammar option in a speech recognition grammar, the program comprising:

means for determining a correct score and a best competitor score for each utterance in an utterance training set;

means for comparing the correct score to the best competitor score for each utterance; and

means for increasing the weight of a first grammar option associated with the correct score by a first amount.

21. A software program for determining an acoustic score of grammar options in an automatic speech recognition (ASR) grammar, comprising:

means for flattening the grammar options in the grammar whereby each option variant associated with each grammar option is explicitly specified;

means for separating each option variant associated with a particular grammar option into a forcing grammar associated with that particular grammar option;

means for applying each forcing grammar to an ASR system to obtain an n-best list for that forcing grammar; and

means for storing the highest score from the n-best as the acoustic score of the particular grammar option.

22. A method of determining weight for an option variant of a grammar option in a speech recognition grammar, the method comprising:

determining a correct score and a best competitor score for each utterance in an utterance training set;

comparing the correct score to the best competitor score for each utterance; and

increasing the weight of a first option variant for a grammar option associated with the correct score by a first amount.

23. The method of Claim 22, wherein the method is iterated to converge on a solution for the weight of the option variant of the grammar option.

24. The method of Claim 22, further comprising decreasing a weight of a grammar option associated with the best competitor score by a second amount.

25. The method of Claim 24, wherein the first amount and the second amount decrease in successive iterations.

26. The method of Claim 24, wherein the second amount is based on a derivative of a sigmoid function.

27. The method of Claim 22, wherein the first amount is based on a derivative of a sigmoid function.

28. The method of Claim 22, further comprising decreasing a weight of a second option variant of a grammar option associated with the best competitor score by a second amount.

29. The method of Claim 28, wherein the first amount and the second amount decrease in successive iterations.

30. The method of Claim 28, wherein the second amount is based on a derivative of a sigmoid function.

31. The method of Claim 28, wherein the first amount is based on a derivative of a sigmoid function.

32. A method of determining weight for an alternative pronunciation of an option variant of a grammar option for a speech recognition grammar, the method comprising:

determining a correct score and a best competitor score for each utterance in an utterance training set;

comparing the correct score to the best competitor score for each utterance; and

increasing the weight of a first alternative pronunciation of an option variant associated with the correct score by a first amount.

33. The method of Claim 32, wherein the method is iterated to converge on a solution for the weight of the alternative pronunciation of the option variant.

34. The method of Claim 32, further comprising decreasing a weight of an alternative pronunciation of a grammar option associated with the best competitor score by a second amount.

35. The method of Claim 34, wherein the first amount and the second amount decrease in successive iterations.

36. The method of Claim 32, further comprising decreasing a weight of a second option variant of a grammar

option associated with the best competitor score by a second amount.

37. A method of supporting development of a phone application grammar for a zero-footprint remotely hosted development environment having a network interface, the method comprising:

receiving over the network interface from a remote computer the phone application grammar;

executing a tuning algorithm on the phone application grammar resulting in a tuned phone application grammar, wherein the tuning algorithm executes without input from a speech specialist; and

presenting the tuned phone application grammar to the remote computer over the network interface.

38. The method of Claim 37, wherein the tuning algorithm is a modified maximum likelihood estimation algorithm.

39. The method of Claim 37, wherein the tuning algorithm is an error corrective training algorithm.

40. The method of Claim 37, wherein the phone application grammar includes pronunciation variants of grammar options.

41. A method of supporting development of a phone application grammar for a zero-footprint extranet hosted application having a network interface, the method comprising:

receiving over the network interface from a remote computer the phone application grammar;

executing a tuning algorithm on the phone application grammar resulting in a tuned phone application grammar, wherein the tuning algorithm executes without input from a speech specialist; and

presenting the tuned phone application grammar to the remote computer over the network interface.

42. The method of Claim 41, wherein the tuning algorithm is a modified maximum likelihood estimation (MLE) algorithm.

43. The method of Claim 41, wherein the tuning algorithm is an error corrective training (ECT) algorithm.

44. The method of Claim 41, wherein the phone application grammar includes pronunciation variants of grammar options.